

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior listing of claims in this application.

1. (Currently amended) An atomic layer doping apparatus comprising:

a first atomic layer doping region for depositing a first dopant species with a first reaction process on a first substrate as an atomic monolayer in the first atomic layer doping region;

a second atomic layer doping region for diffusing said first dopant species in said first substrate with a second reaction process, wherein said first and second atomic layer doping regions are chemically isolated from one another by [[an]] a vertical inert gas curtain, and wherein said second reaction process is different from said first reaction process; and

a central loading robot assembly for moving said first substrate from said first doping region physically laterally through said vertical inert gas curtain to said second doping region.

Claims 2-5 (Canceled).

6. (Currently amended) The doping apparatus of claim 1, wherein said central loading robot assembly is further able to move said substrate from said second doping region back to said first doping region physically laterally through said inert gas curtain.

7. (Currently amended) The doping apparatus of claim 1 further comprising a plurality of said first and second atomic layer doping regions located around the central loading robot assembly.

8. (Currently amended) The doping apparatus of claim 7, wherein said plurality of said first and second doping regions are grouped in pairs of first and second doping regions around the central loading robot assembly, so that at least said first substrate and a second substrate can be treated simultaneously in respective pairs of first and second doping regions.

9. (Original) The doping apparatus of claim 8 further comprising a third pair of first and second atomic layer doping regions for processing a third substrate in said third pair of first and second atomic layer doping regions simultaneously with processing of said first and second substrates.

10. (Previously presented) The doping apparatus of claim 7, wherein said loading assembly is located at the center containing said doping regions.

11. (Currently amended) The doping apparatus of claim 1 further comprising at least one third atomic layer doping region communicating with one of the first or second atomic layer doping regions separated by vertical inert gas curtains.

12. (Previously presented) The doping apparatus of claim 11, wherein said first, second, and third doping regions are adjacent to one another and chemically isolated.

13. (Currently amended) The doping apparatus of claim 12, wherein said first, second, and third doping regions are chemically isolated from one another by vertical inert gas curtains.

Claims 14-15 (Canceled).

16. (Currently amended) The doping apparatus of claim 11, wherein said central loading robot assembly is further able to move sequentially said first substrate

among said first doping region, said second doping region, and said third doping region ~~physically~~ laterally through said vertical inert gas curtains, and wherein said third doping region conducts a third reaction process different from said first and second reaction processes.

17. (Currently amended) The doping apparatus of claim 16, wherein said central loading robot assembly is further able to move sequentially another substrate among said first doping region, said second doping region, and said third doping region ~~physically~~ laterally through said vertical inert gas curtains.

Claims 18-45 (Canceled).

46. (Currently amended) An atomic layer doping apparatus comprising:

a first atomic layer doping region for depositing a first dopant species with a first reaction process on a first substrate as a monolayer in the first atomic layer doping region;

a second atomic layer doping region for diffusing said first dopant species in said first substrate with a second reaction process, said first and second doping regions being chemically isolated from one another by ~~[[an]]~~ a substantially vertical inert gas curtain, wherein said substantially vertical inert gas curtain is provided at a higher pressure than an atmosphere containing said first dopant species, and wherein said second reaction process is different from said first reaction process; and,

a central loading robot assembly for moving said first substrate from said first doping region to said second doping region ~~physically~~ laterally through said substantially vertical inert gas curtain, thereby enabling deposition of a first atomic

monolayer in said first doping region, followed by diffusion of said first atomic monolayer in said second doping region.

47. (Currently amended) An atomic layer doping apparatus comprising:

a first atomic layer doping region for depositing a first dopant gas species with a first reaction process on a first substrate as a monolayer in the first atomic layer doping region, said first dopant gas species exhausted through a first gas port;

a second atomic layer doping region for diffusing said first dopant gas species in said first substrate with a non-reactive gas species with a second reaction process, said first and second doping regions being chemically isolated from one another by ~~[[an]]~~ a vertical inert gas curtain provided at a higher pressure than an atmosphere containing said first dopant gas species, wherein said non-reactive gas species is exhausted through a second gas port, and wherein said second reaction process is different from said first reaction process; and

a central loading robot assembly for moving said first substrate from said first doping region to said second doping region ~~physically~~ laterally through said vertical inert gas curtain, thereby enabling deposition of a first atomic monolayer in said first doping region, followed by diffusion of said first atomic monolayer in said second doping region.

48. (Currently amended) An atomic layer doping apparatus comprising:

a first atomic layer doping region comprising a susceptor and a heater assembly for depositing a first dopant species on a first substrate as an atomic monolayer with a first reaction process in the first atomic layer doping region;

a second atomic layer doping region comprising a susceptor and a heater assembly for diffusing said first dopant species in said first substrate with a second reaction process, wherein said first and second atomic layer doping regions are isolated from one another by a vertical physical barrier having a closeable opening, and wherein said second reaction process is different from said first reaction process ; and

a central loading robot assembly for moving said first substrate from said first doping region to said second doping region ~~physically~~ laterally through said closeable opening of said vertical physical barrier, thereby enabling deposition of a first atomic monolayer in said first doping region, followed by diffusion of said first atomic monolayer in said second doping region.

49. (New) The atomic layer doping apparatus of claim 1, wherein said first and second atomic layer doping regions are separate reaction chambers, and wherein the reaction chambers are separated by the vertical inert gas curtain.

50. (New) The atomic layer doping apparatus of claim 46, wherein said first and second atomic layer doping regions are separate reaction chambers, and wherein the reaction chambers are separated by the vertical inert gas curtain.

51. (New) The atomic layer doping apparatus of claim 47, wherein said first and second atomic layer doping regions are separate reaction chambers, and wherein the reaction chambers are separated by the vertical inert gas curtain.

52. (New) The atomic layer doping apparatus of claim 48, wherein said first and second atomic layer doping regions are separate reaction chambers, and wherein the reaction chambers are separated by the vertical inert gas curtain.